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# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

#### Improvements in or relating to Agricultural and Horticultural Implements

I, ALFRED WILLIAM TURNER, a British subject of "Clovelly," Chelwood Gate, Haywards Heath, Sussex, do hereby declare the invention for which I pray that a patent  
5 may be granted to me, and the method by which it is to be performed, to be particularly described in and the following statement:—

This invention concerns agricultural and  
10 horticultural implements and more particularly implements for cultivating or hoeing the soil around and under bushes and the like.

Mechanised implements used at the  
15 present time for cultivating and hoeing utilise tools which are either propelled or drawn by a tractor or other power unit and which over the whole width of the tool cut through or dig into the soil in the direction  
20 of movement of the tractor or power unit. Such implements can be used effectively in the main space between rows of bushes and trees, but cannot cultivate the soil in the area immediately round the stems or boles  
25 of the bushes or trees as the known implements cannot be used very close to the latter as the bushes or trees are liable to be cut through or uprooted by such implements. Such areas must thus be cultivated  
30 by hand, this being an extremely time consuming operation.

It is an object of this invention to provide an implement which can be mechanically driven and can safely be used close to the  
35 stem or bole of a bush or tree.

The implement according to this invention comprises a plurality of arms projecting individually outwardly from a central hub which is arranged to be rotatable about an  
40 upwardly directed axis on a mounting adapted to be propelled or drawn over the surface of the ground to be cultivated, each said arm having at its outer end which is free a tool or cutter, the arrangement being

such that, as the implement moves over the  
45 ground with the said tools or cutters engaged in the ground, movement through the ground of those tools or cutters to one side of the implement is resisted to a much greater extent than movement through the ground  
50 of those tools or cutters to the other side of the implement so that the assembly of hub, arms and tools or cutters rotates about said mounting and moves substantially as if it were rolling along a line parallel to the  
55 direction of travel of the implement.

It will be appreciated that the motion of the implement of this invention is such that, if the implement is moved relatively to a  
60 line of bushes such that the line joining the stems of the bushes to the line along which the said assembly may be considered to be rolling, then, because the assembly has this effective rolling motion and because the  
65 outer ends of said arms are free, i.e. the spaces between the outer ends of the arm are open and not bridged by any parts coupling these ends of the arms, the bushes will not be damaged by the tools and yet  
70 the whole of the area up to the bush stems covered by the implement will be cultivated.

The greater resistance to movement through the ground of one side of the  
75 implement may be provided simply by inclining the assembly of hub, arms and tools or cutters so that one side digs deeper into the ground than the other side. However, advantageously, the differential resistance is at least mainly provided by forming  
80 the tools or cutters so that these are blunt on one edge, which will be the trailing edge with respect to the intended direction of rotation of the assembly, and sharp on the opposite edge. Such differential resistance may be enhanced by inclining the assembly  
85 as referred to above, and/or by raking the tools or cutters and/or said arms.

The tools or cutters may be of any

[P. 2]

convenient shape or form depending on the action they are required to perform. Thus they may be generally downwardly directed tines or they may be in the form of generally horizontal hoe blades, or any combination of tines and hoe blades may be used. For example, tines and hoe blades may be arranged alternately around the implement.

The said mounting may be carried by an arm adapted to be manually propelled or drawn or adapted to be attached to a tractor or other power unit to be mechanically propelled or drawn.

Although no drive to the hub arms and tools assembly is required other than that imparted to it as the implement is moved relatively to the ground, a drive to it from the tractor or other power unit could be provided if considered desirable. Such drive would, however, be suitably geared, for example to the front wheel of the tractor, so that the said assembly is at all times driven at that speed which would give it said rolling motion.

If desired means, such as a ratchet device, may provide neutral and reverse position for the hub, arms and tools assembly since in such operations, for example, in open field work, tilting of the assembly is undesirable and reverse rotation would clear the tools of any weeds etc., with which they may be clogged.

In order that this invention may more readily be understood, reference will now be made by way of example to the accompanying drawings in which:—

Figure 1 is a perspective view of one embodiment of implement according to this invention;

Figure 2 is a diagrammatic plan view of the rotary part of the implement of Figure 1 illustrating the effective rolling motion of such part;

Figure 3 is a side elevation, partly in section, of one tine of the implement of Figure 1 and of the attachment of such tine to the hub;

Figure 4 is a plan view of such tine;

Figure 5 is a section on the line V-V of Figure 4; and,

Figure 6 is a view similar to Figure 3, but illustrating a modified tine and attachment therefor.

With reference to Figures 1 to 5, the implement there illustrated comprises a mounting in the form of a frame 1 adapted to be secured to a mechanically propelled cultivating machine (not shown) adjacent the front wheel thereof so as to extend forwardly of such machine. The frame 1 is formed by bending flat metal strip and comprises two side arms 2, the rear ends of which are provided with bolt holes 3 for attachment of the frame to said machine, and an integral forward arm 4 joining said

side arms. To one side of the forward arm 4 is secured a forwardly extending bracket 5 carrying a downwardly directed leg 6 on which is rotatably mounted a ground engaging wheel 7. The leg 6 is mounted so as to be vertically adjustable on the bracket 5 and such leg also carries a scraper 8 for the wheel 7.

Across the frame 1 at a position rearwardly of the arm 4 extends a support member 9 carried by brackets 10 secured to the side arms 2, such support member 9 projecting beyond the side arm 2 on that side of the frame on which the wheel 7 is provided. The brackets 10 are adjustable vertically on the side arms and also longitudinally of the latter, by the brackets and side arms both being provided with a series of holes into any selected ones of which securing bolts 11 may be engaged.

At the outwardly projecting end of the member 9, the latter carries a bearing 12 which carries for rotation about a vertical axis a hub 13 outwardly from which extend in a horizontal plane a series of equal length arms 14, the outer ends of which are downwardly cranked to form integral tools 15. The arms 14 are arranged in the manner of the spokes of a wheel and are inclined to radii of the hub, being angled in a rotationally trailing direction, i.e. in a direction opposite to that indicated by A in Figure 1. As shown in Figure 3, the hub 13 comprises two superimposed plates 16 and 17 and each arm 14 is bolted to the hub at two spaced positions, one through both plates 16 and 17 and the other through plate 17 only.

The tools 15 are in the nature of hoe blades and, as shown in Figures 3 to 5, have a wedge-shaped cross-section one edge 18 being sharp and the other edge 19 being blunt. The blunt edges 19 are the rotationally trailing edges of the tools 15.

It will be appreciated that, when the implement is propelled in the direction B, Figures 1 and 2, since the edges of the tools on the outer side of the assembly of hub, arms and tools which face forwardly are the blunt edges 19 and the edges of the tools on the other side of this assembly which face forwardly are the sharp edges 18, the ground provides a greater resistance to movement of the outer side of this assembly than to movement of the inner side and the assembly rotates in the direction of arrow A (Figures 1 and 2). As shown in Figure 2 the assembly moves as if it were rolling along a line 20 parallel to the direction of travel B of the machine, such line 20 passing through the outermost point of the assembly. Figure 2 also shows how, since the outer ends of arms 14 are free, i.e. the spaces between the arms are open, the implement can work close to a line of bush

stems 21 without damaging the latter.

By providing two implements, one on each side of the machine, with the diameter of each of the hub, arms and tines assemblies equal to half the spacing between rows of bushes, a single run by the machine between the two rows of bushes will cultivate the whole of the ground area between these rows, including the areas beneath the bushes and around the stems thereof.

This could be done in the embodiment described above by extending the member 19 beyond the other side arm 2 and mounting on such extension a further hub, arms and tools assembly. Such assembly would not be identical with that illustrated since the tools would require to have a reversed orientation.

If the implement illustrated in Figures 1 to 5 were to be drawn by a tractor, instead of being propelled by a cultivating machine, the hub, arms and tools assembly illustrated would have to be replaced by one with the tools in reversed orientation or re-sited to the opposite side of the frame.

Figure 6 illustrates a modification of the hub, arms and tools assembly of the implement of Figures 1 to 5. In this modification, the arm 14 is mounted on the hub 13 so as to be capable of some vertical pivoting movement to enable the tool to ride up and down when the ground is particularly rough. The hub in this modification comprises two plates 22 and 23 and the arm 1 is mounted on bolts 24 with the interposition of springs 25, the apertures in the arms through which the bolts pass being sufficiently large to accommodate vertical pivoting movement of the arms. The tool 15 of this modification also has projecting downwardly from its blunt edge 19 a member in the form of a lug 26 adapted by digging into the ground to limit the depth to which the tool 15 will enter the ground. This member 26 is pivoted so as to be capable of swinging upwardly away from the tool so as to ride over the ground when the tool by which it is carried is at the rotary position at which it is moving in the direction of travel of the implement.

#### WHAT I CLAIM IS:—

1. An agricultural or horticultural implement comprising a plurality of arms projecting individually outwardly from a central hub which is arranged to be rotatable about an upwardly directed axis on a mounting adapted to be propelled or drawn over the surface of the ground to be cultivated, each said arm having at its outer end which is free a tool or cutter, the arrangement being such that, as the implement moves over the ground with the said tools or cutters engaged in the ground, movement through the ground of those tools or cutters to one side of the implement is

resisted to a much greater extent than movement through the ground of those tools or cutters to the other side of the implement so that the assembly of hub, arms and tools or cutters rotates about said mounting and moves substantially as if it were rolling along a line parallel to the direction of travel of the implement.

2. An implement according to claim 1, wherein said tools or cutters are blunt on one edge which will be the trailing edge with respect to the intended direction of rotation of the assembly of hub, arms and tools or cutters and sharp on the opposite edge.

3. An implement according to claim 1 or 2, wherein the tools or cutters are tines extending downwardly from the free ends of said arms.

4. An implement according to claim 1 or 2, wherein the tools or cutters are generally horizontal hoe blades.

5. An implement according to claim 4, wherein the said hoe blades are integral with said arms and are formed by downwardly cranking the free ends thereof.

6. An implement according to any preceding claim, wherein each of the said tools or cutters has on its trailing edge a downwardly extending member adapted to dig into the ground to limit the depth to which the tool or cutter enters the ground.

7. An implement according to claim 6, wherein said members is pivotally mounted so as to swing upwardly and ride over the ground when the tool or cutter by which it is carried is at the rotary position at which it is moving in the direction of travel of the implement.

8. An implement according to any preceding claim, wherein each tool or cutter is pivotally mounted on said hub so as to be capable of limited vertical movement.

9. An implement according to any preceding claim, wherein the said mounting comprises a frame adapted to be attached to a tractor or propelling power unit and having a ground engaging wheel at the part of the mounting remote from that part by which the mounting is attached to the tractor or power unit, said hub being mounted to one side of said wheel.

10. An agricultural or horticultural implement substantially as hereinbefore described with reference to and as shown by Figures 1 to 5 of the accompanying drawings.

11. An implement according to claim 10 modified substantially as hereinbefore described with reference to and as shown by Figure 6 of the accompanying drawings.

J. A. KEMP & CO.,  
Chartered Patent Agents,  
14 South Square, Gray's Inn,  
London, W.C.1.

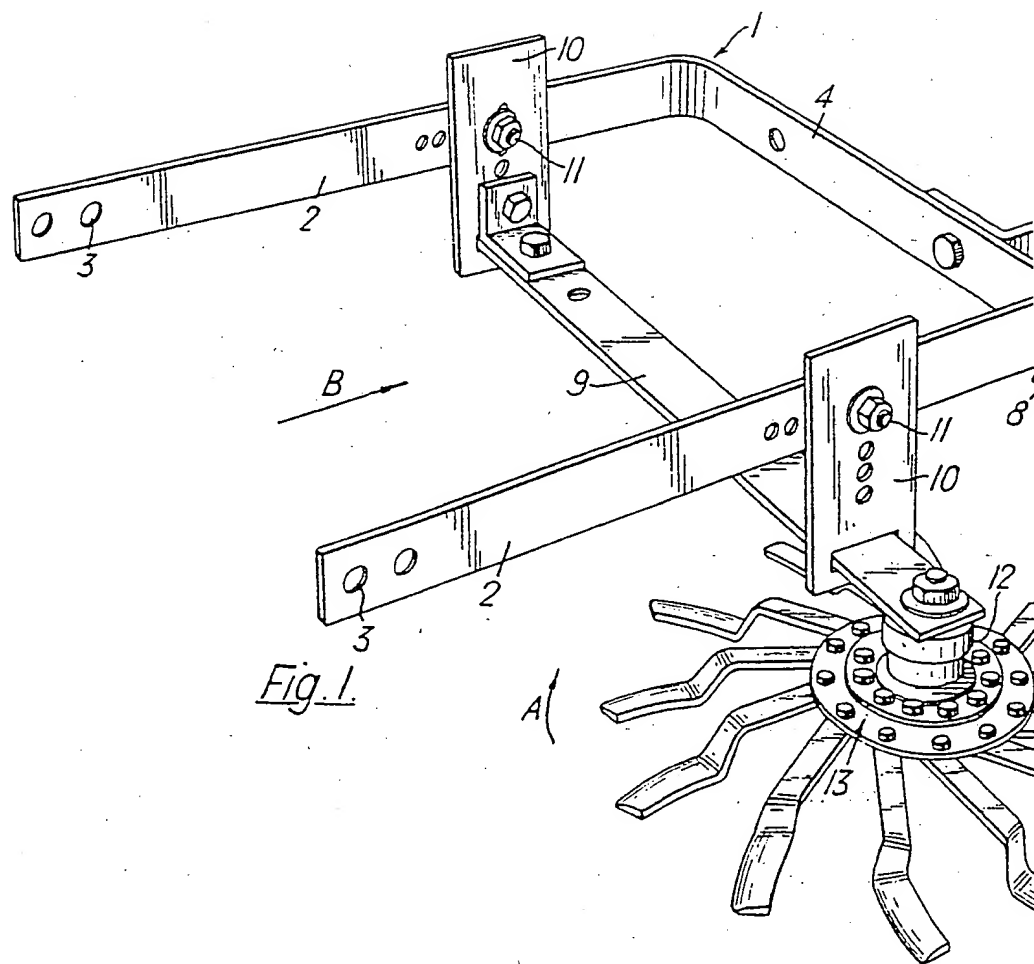


Fig. 1.

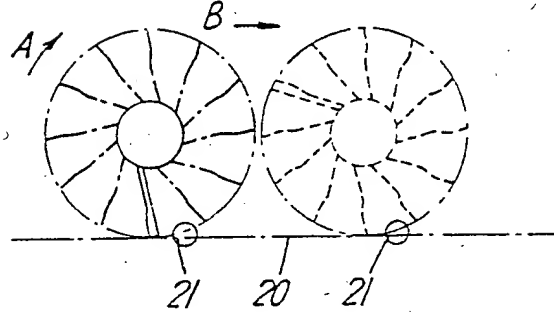
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COMPLETE SPECIFICATION

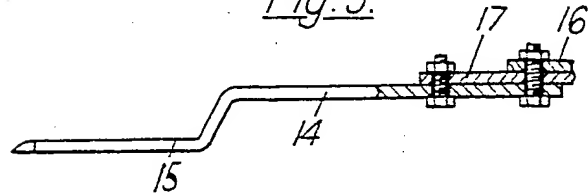
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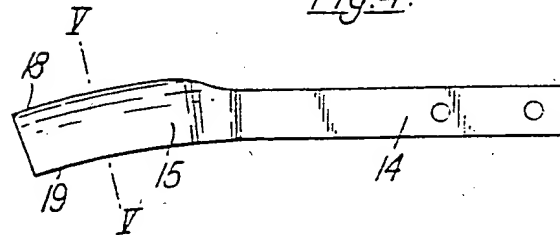
*Fig. 2.*



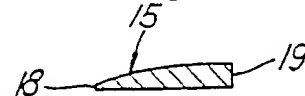
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Fig. 6.*

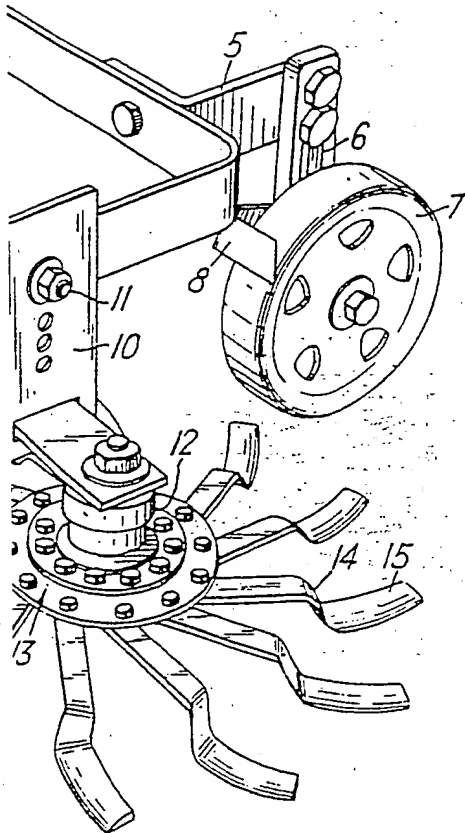
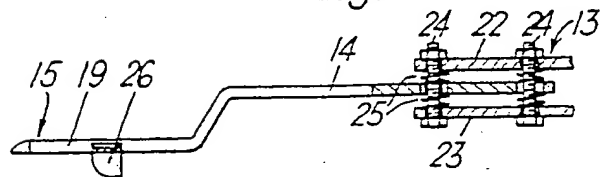


Fig. 2

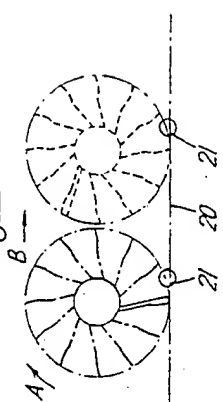


Fig. 3

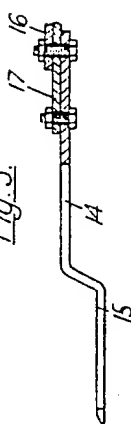


Fig. 4

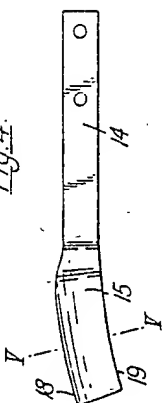


Fig. 5

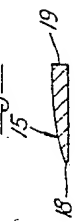


Fig. 6

